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Energy Security: A Global Challenge

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By
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Energy Security: A Global Challenge

Institute for National Strategic Studies / NDU

Panel on emerging petroleum and natural gas issues

Washington / Fort McNair 30-Sep-2009

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Energy Security: What's it all about?

Churchill's Law

Safety and certainty in oil lie in variety and variety alone.

Thatcher's Law

The unexpected happens. You had better prepare for it.

Palmerston's Law

We have no eternal allies and no perpetual enemies. Our interests are perpetual and eternal.

Source: Deutsche Bank

■ Vulnerability

- Rise in import quantity and balance of payments / currency issues
- Disruptions / market failures
- Political turmoil (MidEast, Africa, Lat.Am)
- Price spikes / market pressures
- Homeland infrastructure

■ Traditional responses to energy security *(risk management)*

- Demand restraint (security of demand?)
- Supply diversity
- Surge production (location?)
- Strategic stocks (when to use?)
- International co-operation / IEA
- Flexible markets (futures; technology)

Do Speculators Threaten Energy Security?

Politicians are looking for somebody to blame

Source: Deutsche Bank

Why Don't They Look Here?

- Extraordinarily strong global economic growth from 2002-2007.
- Constrained oil supply from key producers like Russia, Venezuela, Nigeria, Iran, Iraq and others.
- Lack of OPEC spare production capacity and untimely cutbacks by OPEC at the end of 2006 that were not reversed until late 2007.
- Subsidies on oil consumption in many rapidly growing (economy, population or both) countries in Asia and the Middle East.
- Untimely strategic petroleum reserve purchases by both China and the US in 2007 and 2008.
- US dollar depreciation.
- Lack of spare refining capacity to handle heavy sour crude oil.

What Does the Past Tell Us About the Future?

Is the energy tank full or running on empty?

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World on the Edge October 2008

If the emerging market economies recover, world GDP could be boosted

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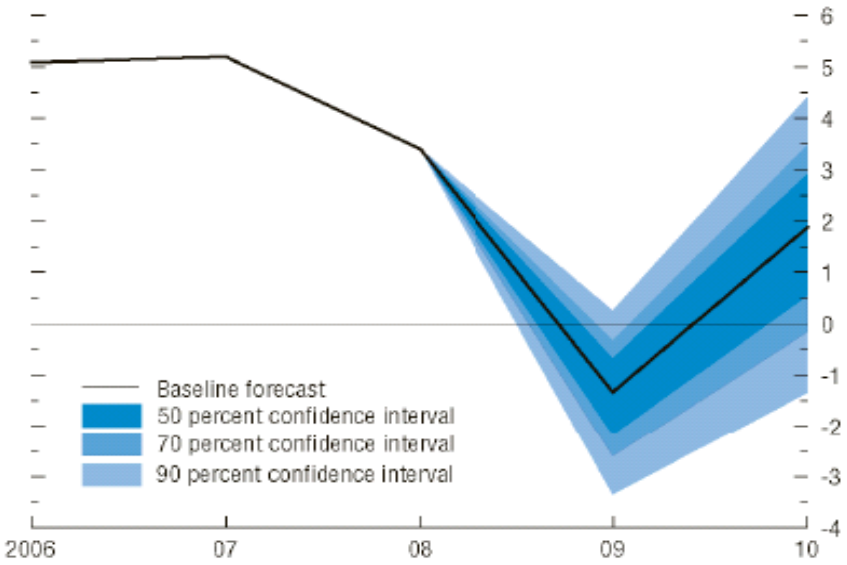
How Low Could Economy Go?

GDP Annual % Change



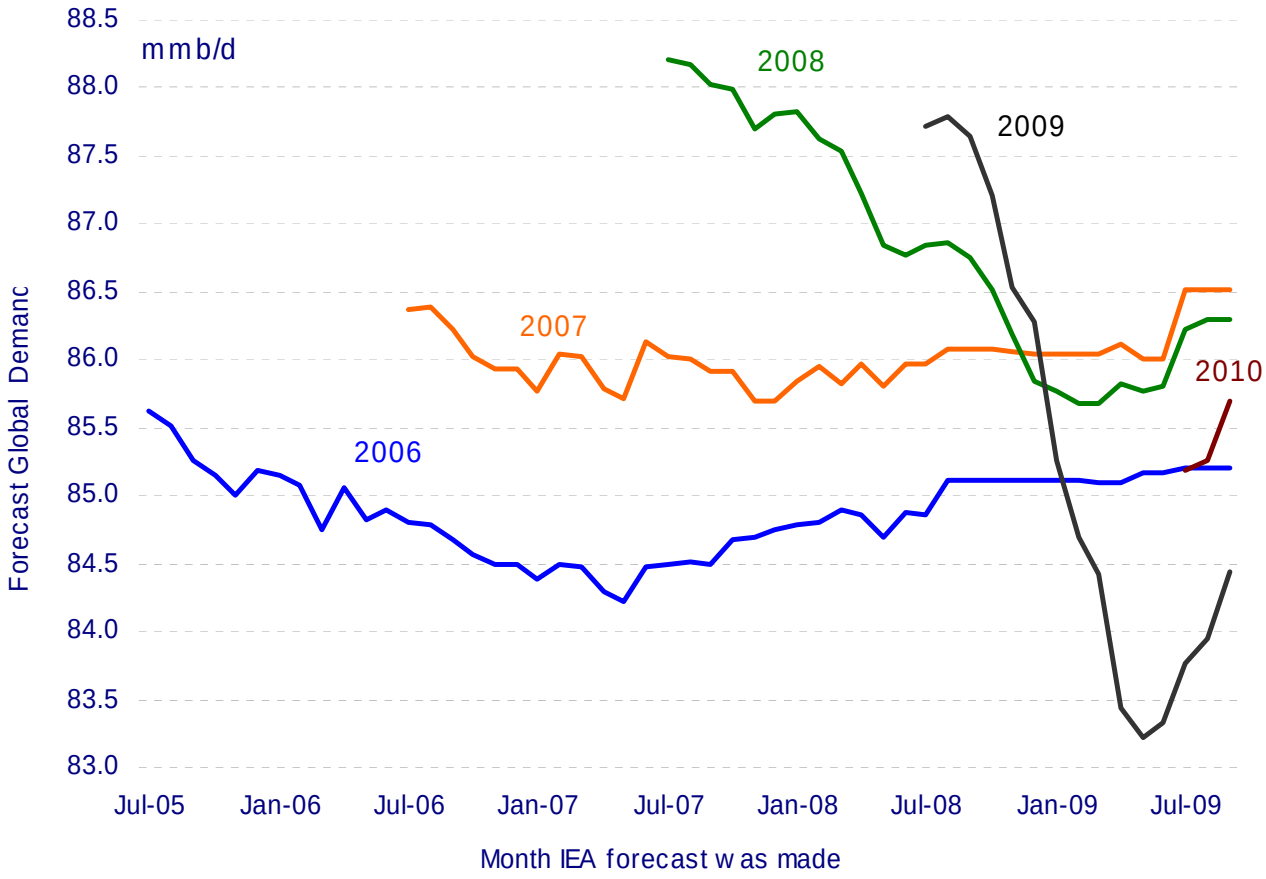
Source: International Monetary Fund, April 22, 2009

What a Global Recession Means for Oil Demand

World oil demand grows at about 1.5-2.0% less than global GDP.

If global GDP is 3% in 2009, oil demand would be expected to rise by only 1%, or about 850kb/d.

Answer: Collapse



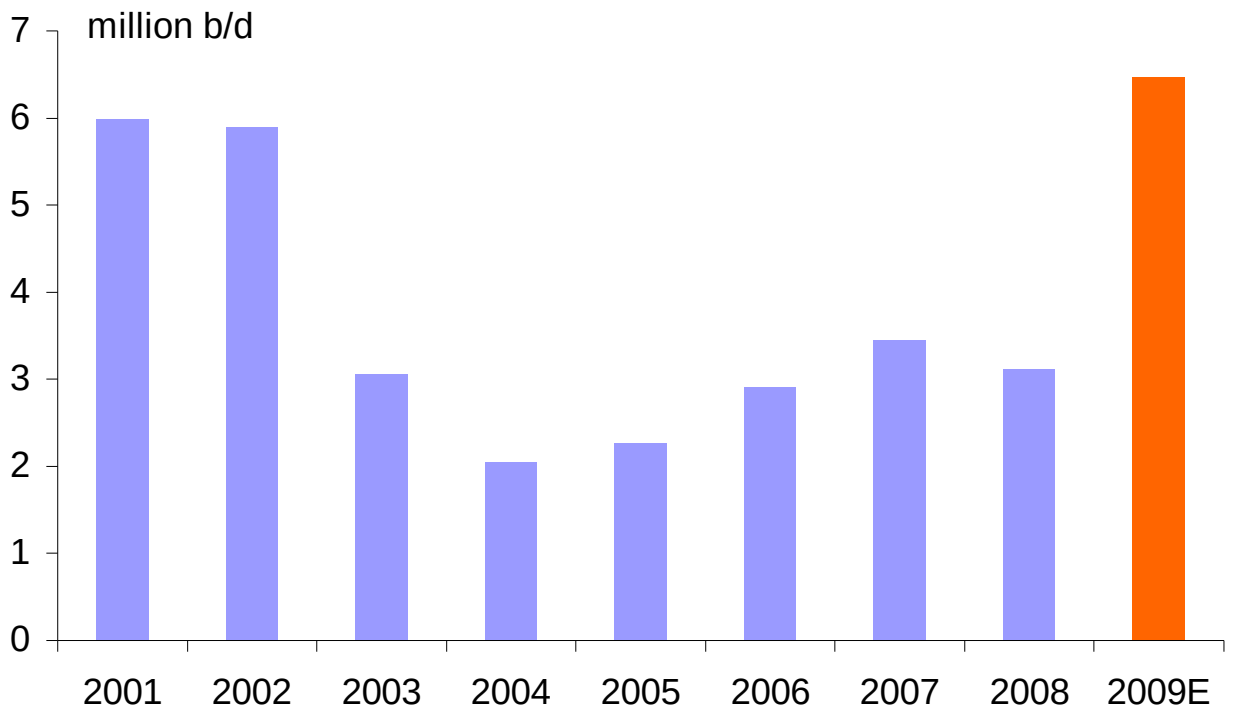
Source: IEA, DB Global Markets Research

OPEC Spare Production Has Rebuilt

As OPEC cuts quotas, spare capacity increases

The lack of spare OPEC production capacity played a strong role in the run-up in oil prices in 2003-08.

In 2009 and 2010, high spare capacity should help moderate prices.



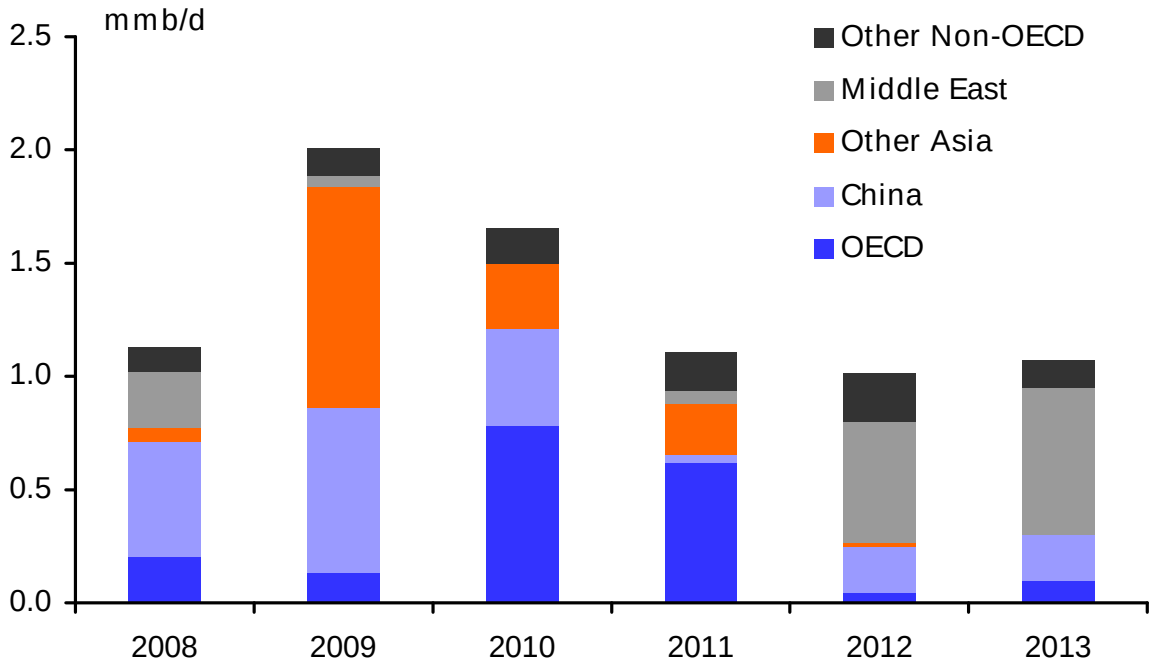
Source: IEA, DB Global Markets Research

Refinery Capacity Additions Are Robust

Distillation capacity rising faster than demand in 2009 and 2010

The lack of spare refining capacity played a strong role in the run-up in oil prices in 2007-08.

This is reversing in 2009-10.

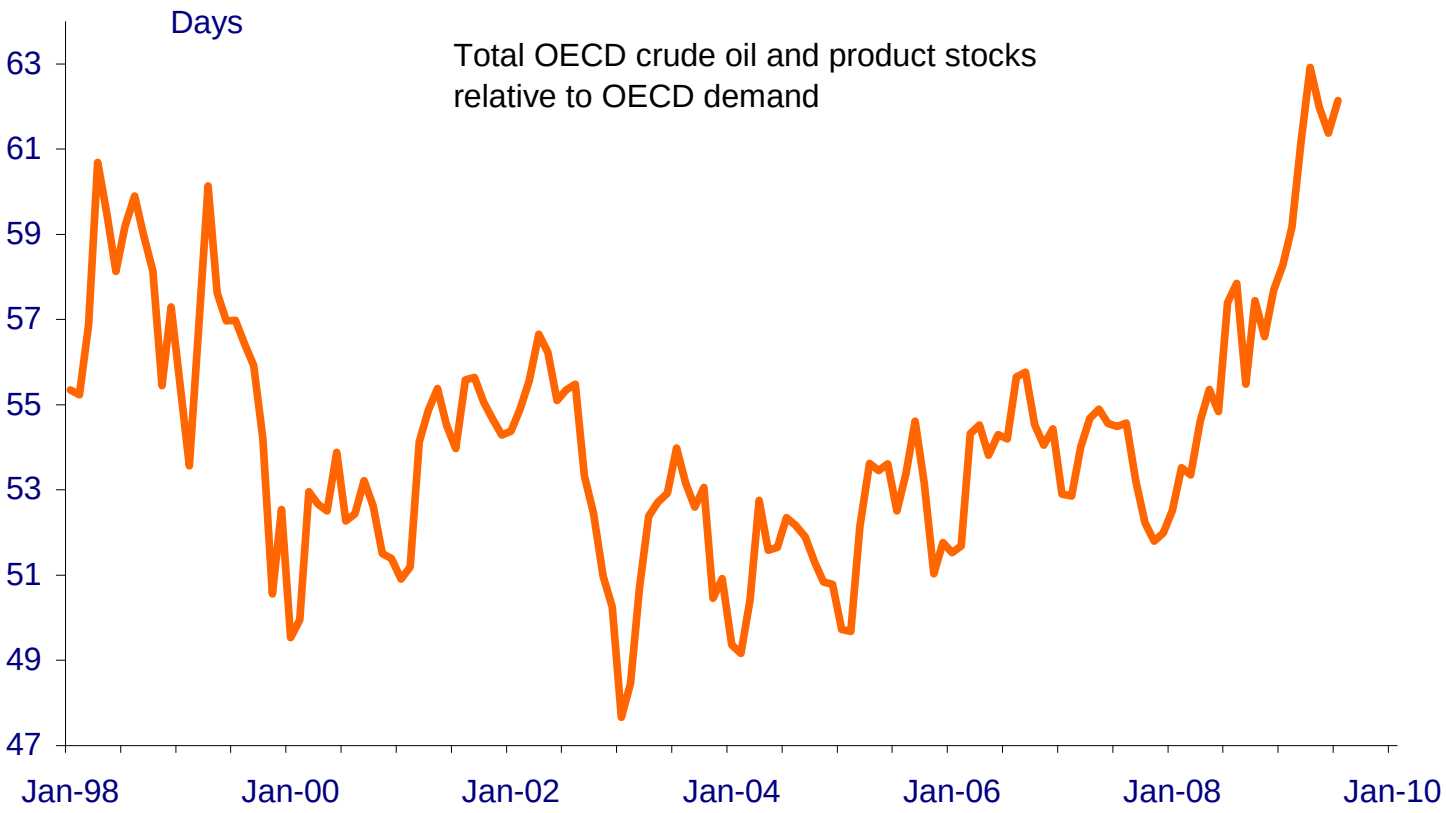


Source: IEA, DB Global Markets Research

OECD Inventories Very High… but Peaked?

Days forward cover of OECD crude and product stocks

Another (usual) sign of near-term weakness in the oil markets.

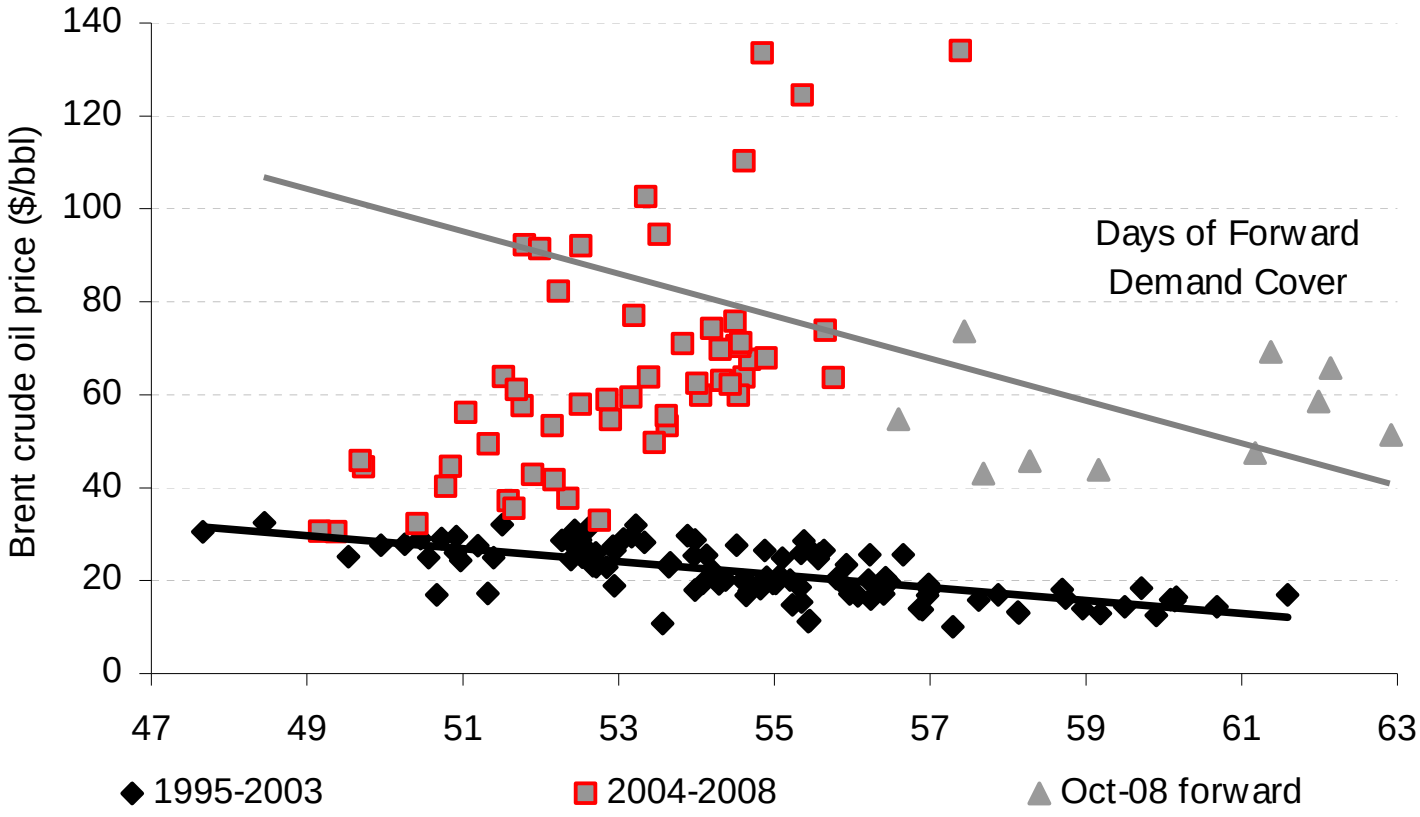


Source: IEA, DB Global Markets Research

Price to Inventory Relationship Returning?

Days forward cover of OECD crude and product stocks vs. oil prices

Suggests that OPEC's ability to manage prices via inventories may be improving.



Source: IEA, DB Global Markets Research

The Panic About the Dollar December 2007

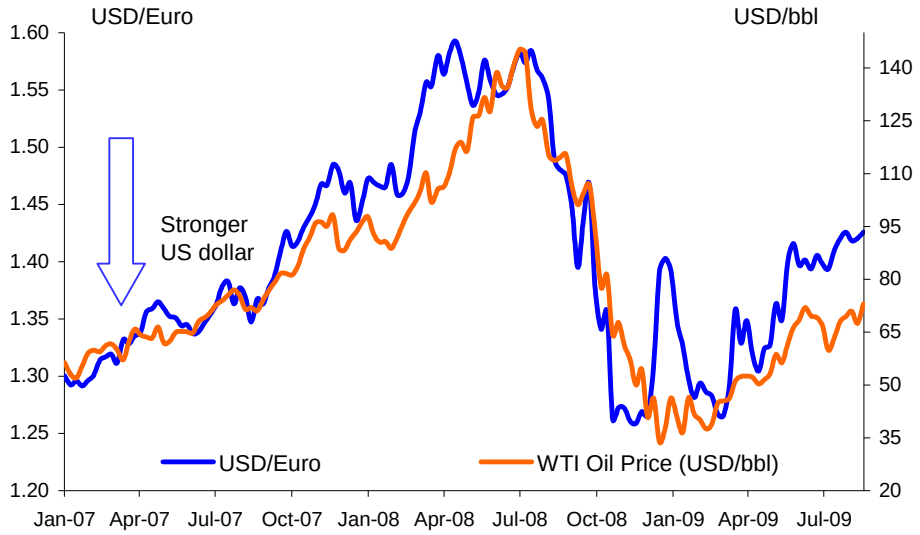
What is the shifting dollar doing to commodities and oil?

The dollar-oil regression is not perfect, but traders like it...

...and a recent study by the IMF says that gold and oil are sensitive to movements in the dollar.

Oil Climbs as the Dollar Flames Out

then reverses …then climbs again



- According to the IMF, in the long run, a 1% depreciation in the US dollar is associated with increases for gold and oil prices of more than 1%.
- In the short run, the elasticity is close to 1, but higher for gold than for crude oil, says the IMF.
- We believe the relationship between oil prices and the US dollar is highly unstable. However, the EURUSD at 1.50 implies triple-digit oil.

Source: Nymex, Bloomberg, DB Global Markets Research

A Glimmer of Hope April 2009

Stock market (the economy) pulled oil down from Jul-08, then up from Mar-09

Looking ahead to late 2010, we wonder if there could be a setback.

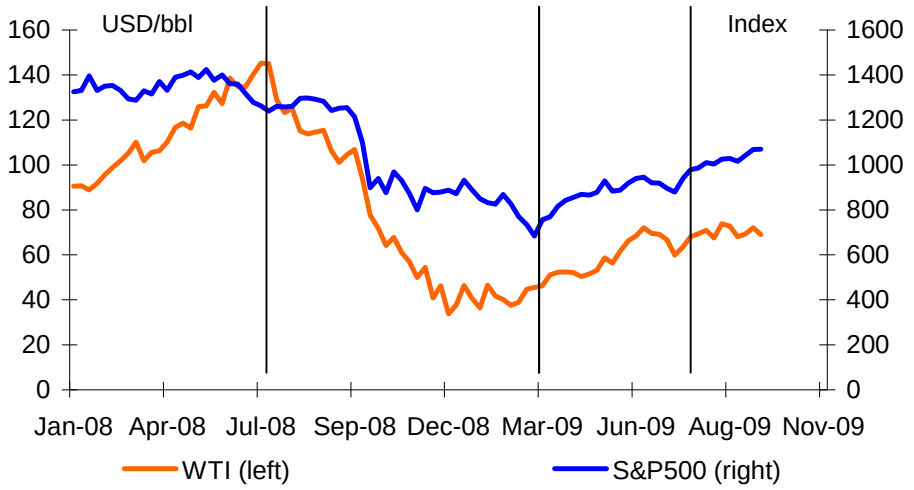
Household buying power may still be constrained.

Capital spending may be crimped by a excess capacity.

Residential investment may be hamstrung by more foreclosures.

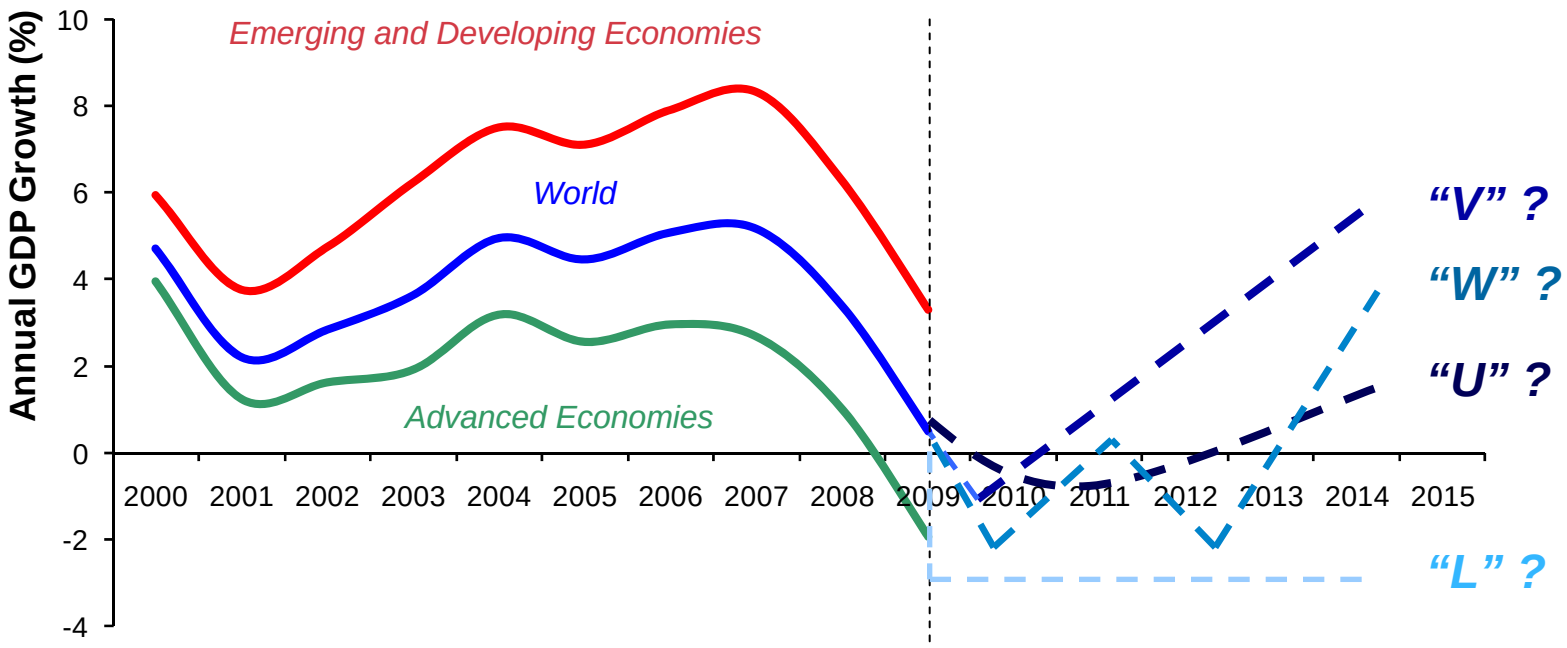
Spending on commercial structures has only recently turned downward.

WTI Crude Oil and the S&P500



- The relationship between the S&P 500 and oil is usually inverse.
- From July 2008 to the start of March 2009, the two moved in parallel.
- From July 2009, the relationship is back to the more traditional inverse correlation.

The Shape of the Economic Recovery Matters



Source: CSIS, IMF, Deutsche Bank

Oiloholics August 2005

A theme that does not go away easily

Twenty five years ago, South Korea and Taiwan were where China and India are now.

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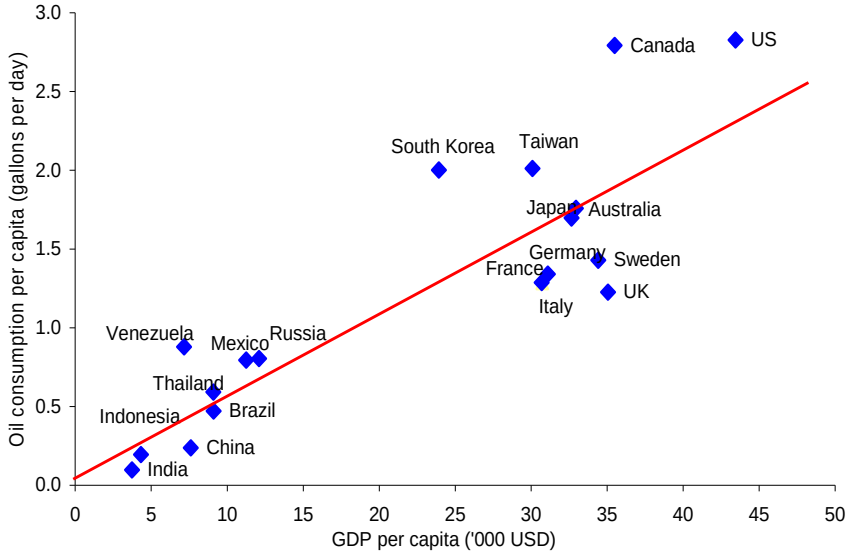
Per Capita Oil Consumption Relative to GDP



Source: IMF, IEA DB Global Markets Research

Outlook

- One third of the world's population is just entering the middle class and want the oil-consuming lifestyle that goes with that.

End of the Oil Age October 2003

Not enough of a good thing?

Some analysts think that global oil production will peak within the next few years.

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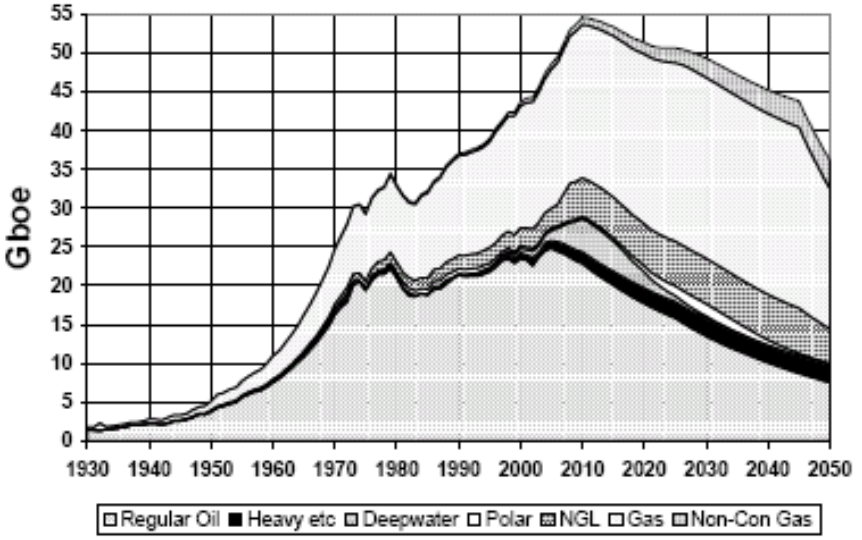
Peak Oil and Peak Gas



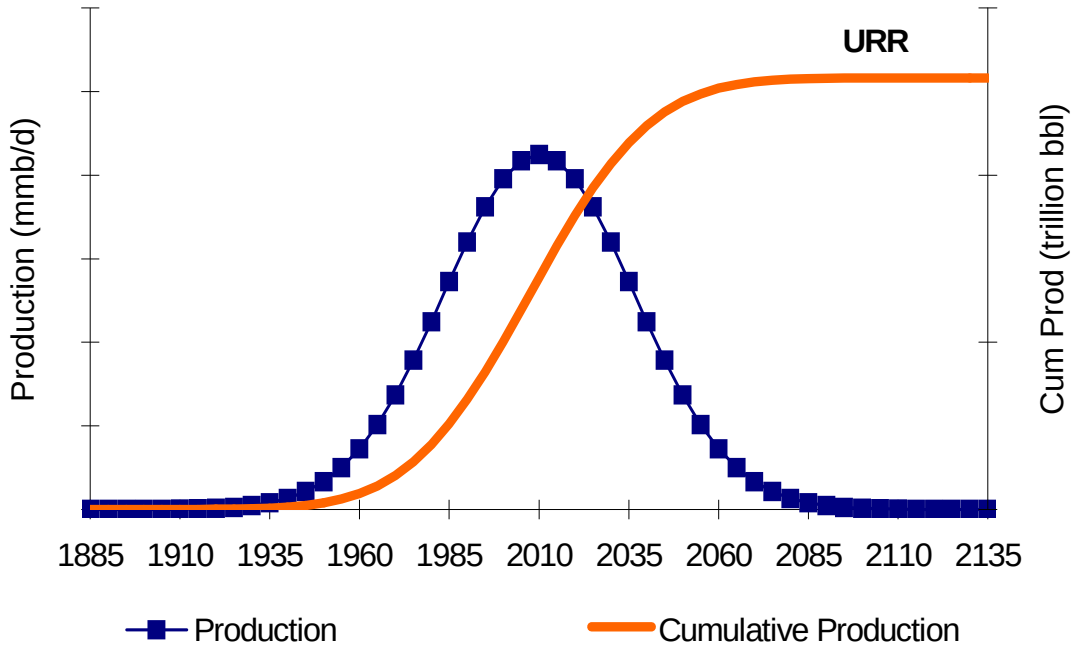
Source: Association for the Study of Peak Oil

Are We Running Out?

Hubbert Peak Curve (Idealized)

"…doomsayers hard at work fanning the flames of hopelessness and pessimism"

Leonardo Maugeri



"Peak Oil" Theory

(1) requires a "final" estimate of the level of ultimately recoverable reserves (URR)… but URR estimates have been rising.

(2) assumes that once half of the world's reserves have been used up, production must fall… but that point keeps moving ahead in time.

Outlook

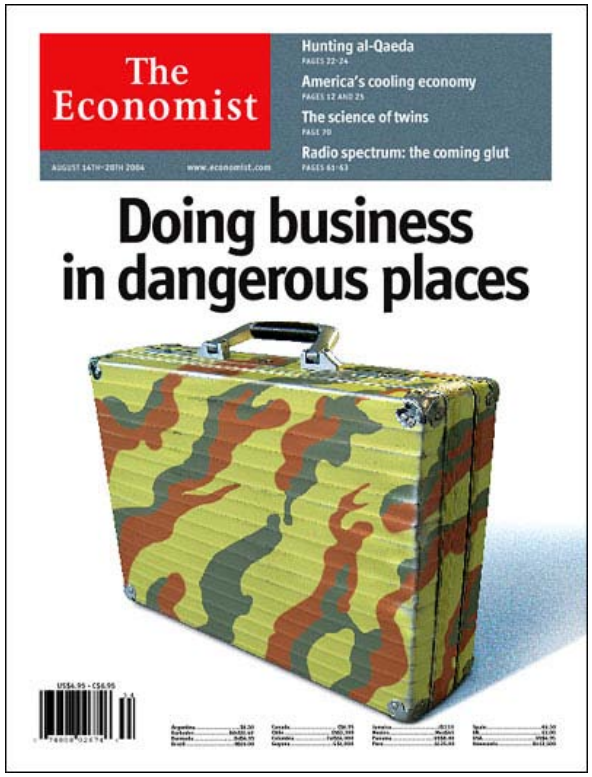
- Dr. M. King Hubbert, a geologist for Shell and the USGS in the early 1960s, used a bell curve to correctly predict the 1972 peak in US oil production. A number of followers have attempted to extend Hubbert's methodology to forecast a world oil peak this decade.
- Hubbert models do not account for changes in technology, costs, prices, or politics - all of which can have a huge impact on the actual shape of the production curve. Hubbert peak oil models assume a symmetric curve to determine the year and amount of peak production.
- Increases in subsoil knowledge, the spread of technological progress, and the advancement of drilling – along with political decisions and oil price changes – have shown time and again that peak production can be increased and delayed, so the decline phase of the bell curve can be shifted to the right.

Source: DB Global Markets Research

Doing Business in Dangerous Places August 2004

Most of the growth in oil production is NOT coming from vacation spots

Many experienced international oil companies say that instability is more of a problem than "dangerous places".



Oil Supply (mmb/d)

	1990	2000	2010E
Saudi Arabia	7.15	9.01	10.73
Russia	10.12	6.52	9.90
United States	7.36	8.08	7.89
Iran	3.13	3.76	4.43
China	2.77	3.23	3.73
Canada	1.34	2.72	3.50
Nigeria	1.81	2.16	2.92
Iraq	2.03	2.58	2.91
Brazil	0.63	1.45	2.85
Kuwait	1.25	2.16	2.82
Venezuela	2.25	3.22	2.81
Mexico	2.55	3.45	2.81
UAE	2.39	2.62	2.78
Norway	1.62	3.35	2.33
Algeria	1.34	1.44	2.02
Kazakhstan	0.43	0.72	1.90
Libya	1.37	1.47	1.76
Angola	0.48	0.75	1.70
Qatar	0.44	0.86	1.54
United Kingdom	1.83	2.70	1.33
Azerbaijan	0.24	0.29	1.30

Source: IEA, DB Global Markets Research

Unstoppable Nuclear Ambitions? May 2006

Nuclear Weapons Controversy

Iran is the 4th largest oil producer in the world…

..and the 5th largest exporter.

Top World Oil Net Exporters (kb/d)

Rank	Country	Exports
1	Saudi Arabia	8,038
2	Russia	7,054
3	United Arab Emirates	2,507
4	Norway	2,361
5	**Iran**	**2,326**
6	Kuwait	2,291
7	Nigeria	2,082
8	Venezuela	1,960
9	Algeria	1,907
10	Angola	1,711
11	Libya	1,584
12	Iraq	1,501
13	Mexico	1,361
14	Kazakhstan	1,213
15	Canada	1,116

Source: US DOE/EIA, 2007 rankings

Trouble with Russia's Economy March 2008

Russian production declines for the first time in a decade in 2008

Putin's policies in his first term worked but in his second term were a disaster for oil output.

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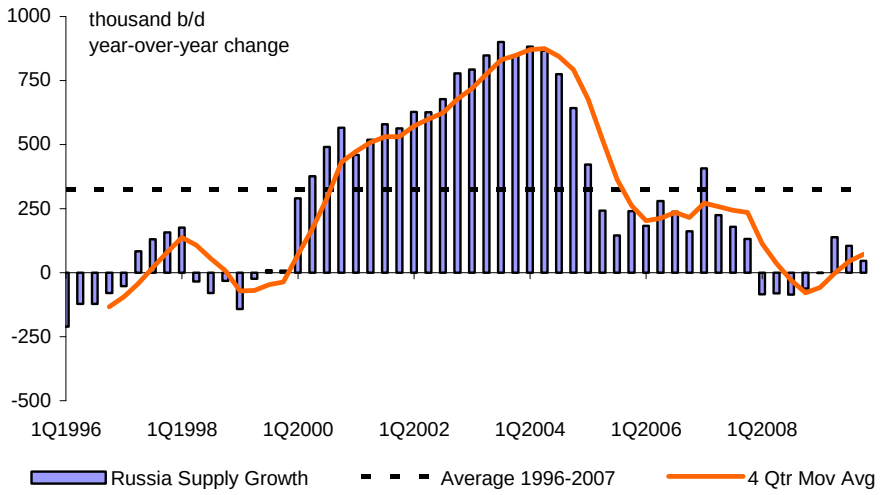
Russian Oil Production Growth



- The Russian government's policy of hostility to its own oil entrepreneurs, growing disdain for foreign capital, and desire to maximize taxes regardless of the impact on capital investment brought an end to the growth in production that characterized President's Putin's first term (2000-2004).
- Although "peak oil" proponents are citing the development as proof that global production is faltering because of geological constraints, we see the situation as offering strong evidence that oil production problems are being driven more by "above the ground" problems.

Source: IEA, DB Global Markets Research

What to Do About Global Warming

Global Warming (Nov 2000)	Greening Up (Jan 2007)

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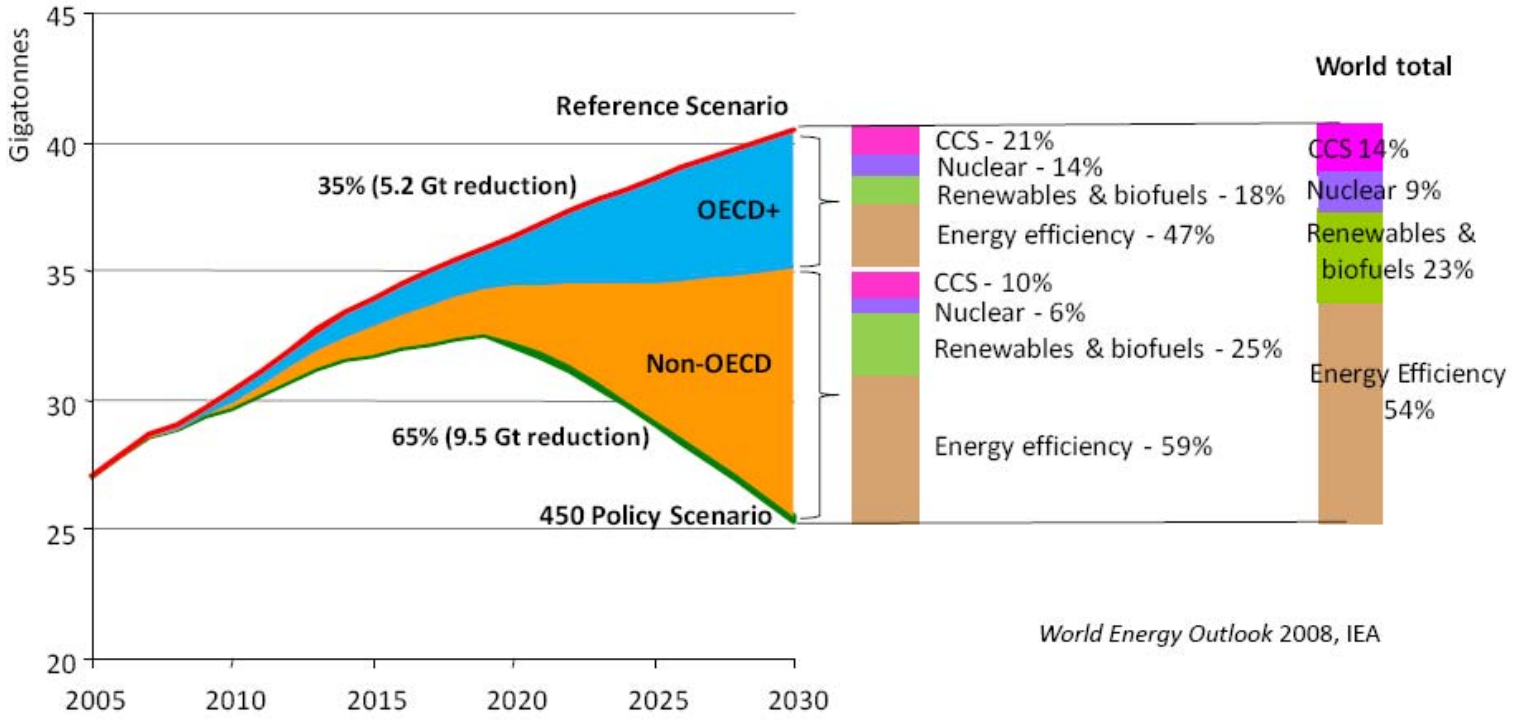
Achieving the IEA's 450ppm Scenario

To hold CO2 in the atmosphere to 450ppm requires a 25gt/yr emission limit



Outlook

- Efficiency gains and deployment of existing low-carbon energy account for most of the savings
- OECD and Non-OECD countries must both work towards reducing CO2emissions
- The scale of effort required is substantial

Getting Rid of CO2 Requires Concentrated Effort

	Technology	Each option would save one gigatonne of CO2 per year
	Nuclear	Build 130 new nuclear power plants each 1GW in size in lieu of new coal-fired power plants without CO2 capture and storage to supplement the circa 450 nuclear plants globally
	Coal-Fired Generation	Build 320 new zero-emission 500MW coal-fired power plants in lieu of coal-fired plants without CO2 capture and storage (none exist now)
	CO2 Capture In Forestry	Convert to new forest a barren area about the size of Spain, 2.5 times the total land area of the state of Washington, or equivalent to 100 million acres
	Improved Efficiency	Deploy 290 million new cars at 40mpg instead of new cars at 20mpg and assuming 12,000 miles per year

Source: DOE Climate Change Technology Program, http://www.climatetechnology.gov/stratplan/final/index.htm

Learning The Hard Way March 2009

Energy policy under the Obama administration

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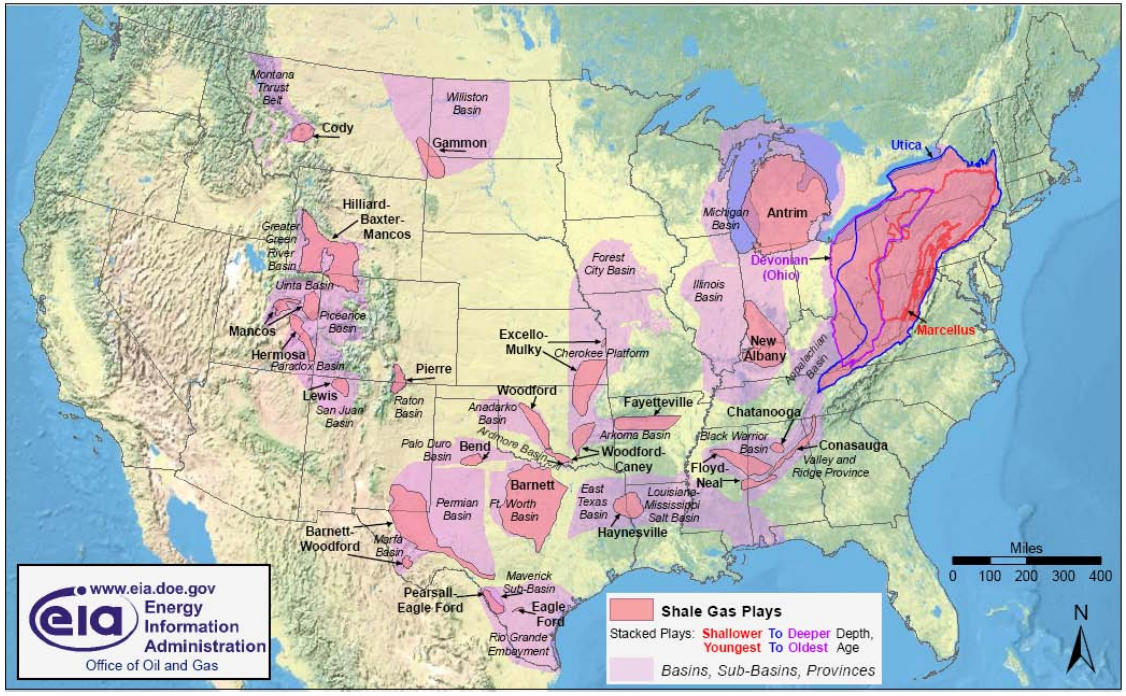
Policy Directions

- **Longer-term policies strongly tied to climate change and alternative fuel proposals**
- **Infrastructure spending to create jobs**
- **Oil/gas taxation components implemented via changes in less visible accounting (LIFO to FIFO) and other such tax rules**
- **New regulations on energy trading activity**
- **Nuclear power supported, but not enthusiastically**
- **Renewable energy and electric autos receive strong backing, and renewable portfolio standards and "smart grid" improvements for electric utilities**

Source: DB Global Markets Research

Shale Gas in the US… an unrecognized CO2 option?

Major US shale basins



Outlook

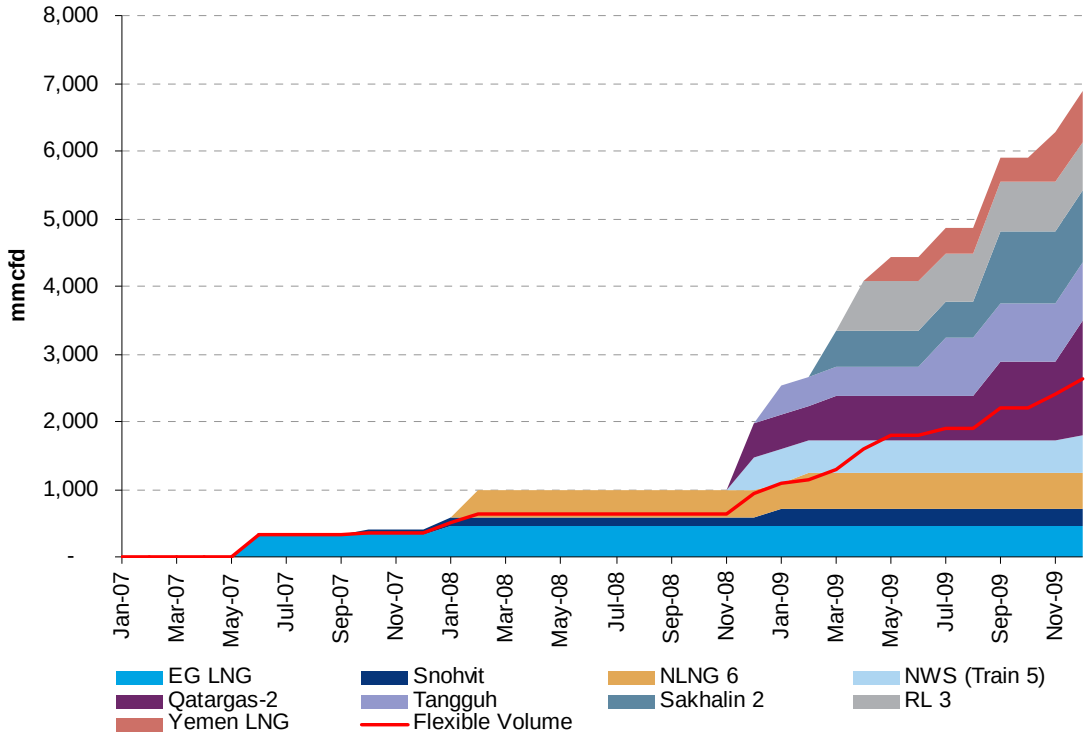
- Independent natural gas producers are increasingly optimistic about their ability to develop shale plays around the US.
- The Barnett shale in Texas has been a huge success. DOE's gas supply models may be underestimating the potential strength of domestic production.
- If the industry is successful in conveying the "supply security" message, natural gas could receive favorable treatment from Washington policymakers, but this will take time and effort

Source: DOE/EIA, DB Global Markets Research

Wave of New LNG Projects in the Pacific Basin

LNG security risks are likely to grow over time.

Projects delayed are about to surge onto global markets



Source: Wood Mackenzie, DB Global Markets Research

Outlook

- Many Pacific Basin projects are starting up considerably later than originally expected
- As production ramps up then Asia will become more self sufficient
- This suggests a substantial drop in cargoes moving from Atlantic to Pacific

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